Factors Associated with Clinic Non-attendance in Adults with Type I Diabetes Mellitus

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In order to examine the causes of non-attendance in a diabetic clinic, a 1-year retrospective casenote review of 259 diabetic patients with no evidence of major complications was undertaken. Frequency of clinic attendance, clinic non-attendance, and glycaemic control (HbA1c) were recorded. In a sub-sample of 82 patients, more detailed demographic data was obtained via questionnaire. During the previous year 39 % of patients had failed to attend the clinic on at least one occasion and 10 % were recurrent non-attenders. Non-attenders had a significantly higher mean HbA_{1c} compared with those who did attend (8.1 ± 2.2 vs 7.6 ± 1.6 %; $p = 0.03$). They were also significantly younger (mean age 27 ± 7 vs 29 ± 9 yrs; $p = 0.02$) and had a significantly shorter duration of diabetes (12 ± 8 vs 15 ± 10 yrs; $p = 0.02$). Attendance did not differ according to gender or age of onset of diabetes. Sub-sample analysis showed that smokers, those with children at home, and single parents were all more likely to default from their appointments. Non-attendance is a significant problem at our diabetic clinic, however, by addressing the reasons why patients fail to attend clinic we hope to develop strategies to encourage regular attendance. This may be translated into improved glycaemic control and ultimately reduce the risk of late diabetic complications. © **1998 John Wiley & Sons, Ltd.**

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Introduction

The management of diabetes mellitus depends on patient self-care practices. Promotion of self-care involves attendance at either hospital or primary care diabetes clinics. Attendance at the diabetes clinic is often poor or sporadic and this may affect on overall health.[1] Patients who have frequent contact with a diabetic clinic have a better prognosis compared with those who do not.[1,2] In a study of Type 1 diabetic patients, glycaemic control was better in those patients who attended clinic compared to those who did not.[3] The Diabetes Control and Complications Trial showed that improved glycaemic control could reduce the incidence and progression of diabetic complications.[4] It might be possible to improve levels of metabolic control and patient health by encouraging good self-care practices, including regular clinic attendance.

There has been little research focusing on the determinants of clinic non-attendance, although one study showed that the presence of major diabetic complications such as sight-threatening retinopathy promoted better attendance.[5] This might be expected, but even less is known about those individuals who have not yet developed severe complications who default from their clinic appointments. Anecdotal evidence suggests that those who do not attend their clinic appointments are often poorly motivated, smokers, and unemployed. However, these preconceptions have not been supported by any formal research findings. The aim of our study was to examine the characteristics of a clinic population of adults with Type 1 diabetes without any major complications in order to identify any differences in clinical parameters and psychosocial characteristics between regular clinic attenders (DAs) and non-attenders (DNAs).

Patients and Methods

This study was based on a review of our diabetes clinic casenotes between July 1995 and June 1996. All Type 1 diabetic patients who were given appointments to attend any of the four major diabetic outpatient clinics or the young adult clinic at our hospital were identified and those with major complications were excluded. Type 1 patients were defined as having an acute onset of symptoms, requiring insulin from diagnosis, less than 26 years old at diagnosis and ketosis prone. Patients aged 16 years and over with a duration of diabetes of

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at least 12 months were included. Patients with a shorter duration than this were excluded due to the possibility of fluctuations in their control while they adjusted to their condition. The age of 16 was used to ensure both ethics approval and valid consent if the patient was recruited into a smaller sub-study investigating the relationship between psychosocial factors and glycaemic control.

Major complications were defined as: ischaemic heart disease (angina or myocardial infarction), proliferative retinopathy and/or maculopathy, overt nephropathy (Albustix positive on 3 separate occasions), peripheral vascular disease, and neuropathy (absent vibratory sense and/or ankle jerks). The presence of these complications depended on the findings being recorded in the notes by the examining physician. Body mass index (BMI) was calculated as weight/height.[2]

All HbA_{1c} results taken in the year prior to and including the current clinic appointment were recorded. HbA_{1c} was measured by an HPLC system (reference range—<5%, standard deviation 0.55). Glycaemic control was defined by both the European IDDM Policy Group 1993 guidelines[6] and by our own local clinical criteria for comparison. The European Policy Group defined good control as a glycosylated haemoglobin <3 standard deviations (SD) above the mean, borderline control 3–5 SD, and poor control >5 SD. This translates to good control being HbA_{1c} values <5.73 %, borderline control 5.73–6.83 %, and poor control >6.83 %. The clinical criteria used in our clinics to define good control are HbA_{1c} values < 7 %, borderline control (or requiring improvement) 7–9.9 %, and poor control ≥10 %.

Attendance rate was calculated as:

$$\frac{\text{number of clinical visits attended}}{\text{number of appointments made}} \times 100$$

When calculating the attendance rate we found an identical proportion of patients had both a 100 % and ⩾ 75 % attendance rate, hence attenders (DAs) were defined as those patients who had a 75 % or more attendance rate during the previous year. Non-attenders (DNAs) were those patients who had less than a 75 % attendance rate, and recurrent non-attenders were those patients who failed to attend three or more clinic appointments.

At the time of the study there was no formally agreed repeat appointment or discharge policy between consultants after a patient had defaulted. It was usual however for the consultant concerned to request that the GP rerefer the patient back to clinic after they failed to keep three consecutive appointments.

A sub-sample ($n = 82$) of these patients were recruited to a separate study investigating the relationship between psychosocial factors and glycaemic control. Patients identified from the casenotes were approached by one of the investigators (CL) during their clinic visit and asked if they would like to participate in this study. A maximum of four patients were recruited each week. Detailed demographic data on employment and marital status, number of children, smoking and alcohol intake were collected using a confidential questionnaire adapted from a previous study.[7] Social class was recorded according to the Registrar General's Classification of Occupations.[8]

Statistical Methods

The data were analysed using the Statistical Package for the Social Sciences (SPSSX). Differences between DAs and DNAs were analysed using the Students *t*-test, analysis of variance (ANOVA), chi-squared analysis, and the Mantel-Haenszel test for linear association. Multiple logistic regression analysis was performed for the sub-sample in order to identify independent associations with non-attendance.

Results

The casenotes of 259 Type 1 diabetic patients were analysed. The mean age of the group was 28 (±9) years, ranging from 16 to 60 years. Approximately equal numbers were male ($n = 133$) and female ($n = 126$). The mean age of onset of diabetes was 14 (±6) years, ranging from 0 to 25 years. Duration of diabetes ranged from 1 to 49 years, the mean duration being 14 (±9) years. The sub-sample of 82 patients were comparable with the total group.

The mean duration between the most recent HbA_{1c} and the clinic visit at which the casenotes were examined was 4.8 (±8.0) months (median 1.6 months). We found a significant correlation between the most recent HbA_{1c} level and any other level checked within the preceding year (r ranged from 0.83 to 0.88; $p = 0.001$). This confirmed that there was very little intra-individual variation in glycaemic control. The most recently available HbA_{1c} was subsequently used in evaluating patients' glycaemic control.

The number of clinic visits per year ranged from 0 to 10 with a mean number of 1.6 (±1.3) per year, with 40 % of patients having one clinic attendance in the previous year and 28 % having two visits. Using an attendance rate, calculated as described above, the same proportion of patients 61 % ($n = 158$) attended 75 % or more of their clinic appointments or 100 % of their clinic appointments during the previous year. Eighty-one per cent ($n = 210$) attended 50 % or more of their clinic appointments. Number of clinic visits did not differ according to gender. The youngest quintile (16–21 years) however had attended clinic significantly more frequently compared with subjects who were older (2.2 vs 1.5 visits per year; $p = 0.0009$).

Figure 1 shows the DNA rate as a per cent of the total population. More than one-third (39 %) of patients failed to attend at least one clinic appointment during the previous year, with 12 % failing to attend two clinic

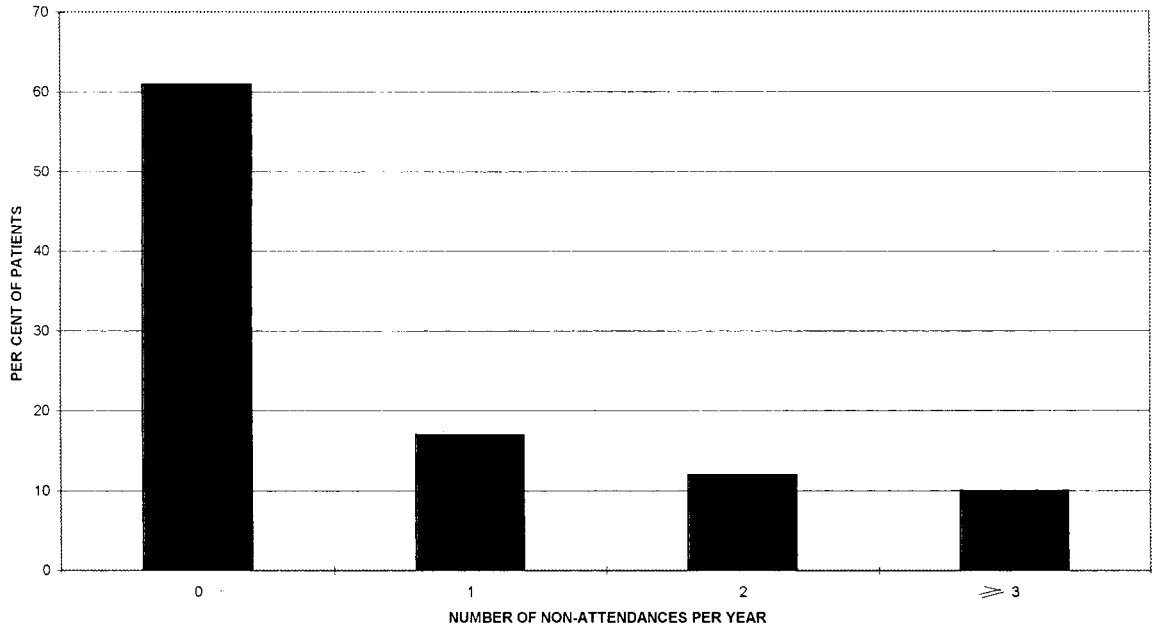

Figure 1. Glycaemic control according to the number of clinic attendance

appointments. Ten per cent were recurrent non-attenders (i.e. failed to attend three or more appointments).

Table 1 compares some of the characteristics of DAs versus DNAs. DNAs were significantly younger than DAs and had significantly shorter mean duration of diabetes. The two groups did not differ in gender or age of onset of diabetes. DNAs had significantly poorer control compared to DAs and this difference remained significant even when the analysis was repeated adjusting for the effects of age. Recurrent non-attenders had even poorer control when compared to DAs (8.8 ± 3.0 vs 7.6 ± 1.6 %; $p = 0.02$).

Only a small proportion (9 %, $n = 23$) of hospital admissions within the previous year were due to diabetes-related conditions, with 5.4 % ($n = 14$) being due to diabetic ketoacidosis and 1.5 % ($n = 4$) to hypoglycaemia. Those patients who were admitted had significantly poorer glycaemic control compared to those not experiencing any hospital admissions in the previous year (mean HbA_{1c} 8.7 ± 2.8 vs 7.5 ± 1.7%; $p = 0.0009$).

Attenders were re-defined as those attending 50 % or more of their appointments and were compared with those attending less than 50 % of their appointments. In contrast to the first analysis, using 75 % attendance, this analysis showed no significant differences between attenders and non-attenders, including no differences in mean HbA_{1c}.

Table 2 shows the distribution of glycaemic control according to both the European Policy Group criteria and our clinical criteria. By the European Policy Group criteria no significant differences were observed between level of glycaemic control and attendance rates. Using our clinical criteria a significantly greater proportion of the DNA group (i.e. attended less than 75 % of their appointments) had poor control compared to DAs (≥75 % attendance rate).

Table 1. Characteristics of attenders[a] and non-attenders[b]

	Attenders ($n = 158$)	Non-attenders ($n = 101$)	p-value
Males (n (%))	76 (48)	57 (56)	0.19
Hospital admissions (n (%))	20 (13)	18 (18)	0.33
Age (years)[c]	29 (± 9)	27 (± 7)	0.02
Duration (years)[c]	15 (± 10)	12 (± 8)	0.02
BMI (kg g m^{-2})[c]	25.1 (± 4.0)	25.1 (± 3.8)	0.89
HbA_{1c} (%)[c]	7.6 (± 1.6)	8.1 (± 2.2)	0.03

[a] Attenders: comprises all subjects who attended ⩾75 % of their clinic appointments during the previous year.
[b] Non-attenders: comprises all subjects who attended <75 % of their clinic appointments during the previous year.
[c] Values are expressed as mean (SD).

Table 2. The distribution of glycaemic control according to the European Policy Group criteria and our clinical criteria

	European Policy Group		Clinical criteria	
	DA *n* (%)	DNA *n* (%)	DA *n* (%)	DNA *n* (%)
Good	20 (12.7)	5 (5.7)	64 (40.5)	27 (31.0)
Borderline	40 (25.3)	20 (23.0)	80 (50.6)	44 (50.6)
Poor	98 (62.0)	62 (71.3)	14 (8.9)	16 (18.4)

European Policy Group criteria: good <5.73 %, borderline 5.73–6.83 %, poor >6.83 %. No significant difference between the two groups. Clinical criteria: good <7.0 %, borderline <7.0–10.0 %, poor >10.0 %. Mantel-Haenszel test for linear association; $p = 0.03$.

Table 3. Multiple logistic regression analysis to examine significant independent correlates of non-attendance

Variable	Odds ratio	(95 % CI)	*p*-value
HbA_{1c}	1.43	(1.06–1.8)	0.0570
Age (years)	0.9	(0.82–0.98)	0.0152
Marital status (single)	0.07	(–1.95–2.09)	0.0102
Children ≥1	1.38	(–0.34–3.10)	0.7130
Marital status × children	66.06	(63.2–68.92)	0.0041
Sex (F)	0.38	(–0.97–1.73)	0.1572
Training	0.52	(–1.11–2.15)	0.4336

Dependent variable : ≥75% attendance rate vs <75% attendance rate.

A U-shaped distribution was observed between level of glycaemic control according to the number of clinic attendances, with patients attending 0 or 4 clinic appointments per year having the poorest control (mean HbA_{1c} 8.3 ± 2.7 % and 8.1 ± 2.6 %, respectively) compared to those who had one, two or three clinic visits per year (7.6 %, 7.5 %, and 7.4 %, respectively).

Results for the sub-sample are reported, again defining those with a 75 % or more attendance rate as DAs vs those with less than this (<75 % attendance) as DNAs. Single parents were more likely to DNA; 30 % ($n = 8$) of DNAs were single parents compared to 4 % ($n = 2$) of DAs ($p = 0.001$). Patients who had one or more child living at home (regardless of marital status) were also more likely to default from clinic appointments, compared to those who did not have children [53 % ($n = 18$) vs 19 % ($n = 19$); $p = 0.01$]. Marital status alone, however, was not significantly associated with non-attendance. Similarly, non-attendance was not associated with social class or employment status (i.e. whether working or not). Patients who did not have any post-school training were more likely to default compared with those who had undergone some training (58 % ($n = 7$) vs 29 % ($n = 20$); $p = 0.05$). However, attendance rates did not differ according to whether or not patients had obtained professional qualifications. Smokers were significantly more likely to default compared to non-smokers (50 % ($n = 10$) vs 27 % ($n = 17$); $p = 0.03$), and there was also a trend for those who drank alcohol to DNA more than those who were teetotal (19 % ($n = 10$) vs 7 % ($n = 2$); $p = 0.1$).

Multiple logistic regression analysis was performed for the sub-sample (see Table 3), using 75 % or more attendance vs less than 75 % as the dependent variable. This analysis demonstrated that the significant independent variables associated with non-attendance were poorer glycaemic control (HbA_{1c}), (younger) age, the presence of one or more children at home, and particularly being a single parent; as seen by the interaction term: marital status × children (odds ratio 66.06; $p = 0.0041$).

Discussion

This study has shown that in our diabetes outpatients department, non-attendance is a significant problem. More than one-third of our patients failed to attend at least once during the previous year, and 1 in 10 patients were recurrent non-attenders. It has been shown that early detection of, and intervention in, diabetic complications is of great importance in the management of diabetes.[4] In our district, Type 1 diabetes is still the province of the secondary care system and so regular hospital clinic attendance is important.

There are limitations to the present study, not least of which is the difficulty of using casenotes to identify patients with and without complications, which may be under-recorded in both those who do attend and those who default. A related difficulty is that due to the selection criteria for this study, these results can only be extrapolated to other groups of Type 1 diabetic patients without any complications who are given appointments to attend diabetes outpatients.

We found significantly poorer HbA_{1c} levels in those individuals who attended less than 75 % of their appointments. No difference in glycaemic control, however, was observed when we redefined the attendance rate as 50 % or more versus less than 50 % of clinic appointments. In other words, only when patients attended at least three-quarters of their appointments was control significantly improved. These findings may suggest that even attending three-quarters of appointments may have important benefits for the clinical attainment of good control. This has implications for clinic policy, as an attendance rate of at least 75 % might be considered as acceptable in the eyes of health care providers, as well as the patient. It could be suggested that in order to obtain maximum benefit, clinical attendance should be both regular and fairly frequent, if good self-care practice is to be reinforced. We did not observe any other differences between those who attended 50 % or more vs <50 % of appointments, suggesting once again that this was not a useful cut-off for distinguishing between defaulters and non-defaulters.

We also observed a U-shaped distribution between glycaemic control and clinic attendance, with those in poorest control being patients who had 0 or 4 attendances in the previous year. It is not surprising that those who have not attended at all have the poorest control, but it is more difficult to interpret the finding that those who come to clinic most frequently are also poorly controlled. This may reflect clinical practice, with the physician requesting that these individuals be monitored more frequently because of their poorer level of glycaemic control.

A previous study has shown that inconvenience of the clinic appointment is an important cause of non-attendance,[9] which may be associated with difficulties in obtaining time off work. In our study, however attendance rates were not associated with employment status. Our multivariate analysis demonstrated that patients with children and especially single parents were significantly more likely to default from their appointments compared to patients without children. It is likely that clinic appointments are more difficult to attend when accompanied by children. Provision of facilities for children, such as a creche, may be warranted to ease this problem.

Smokers were more likely to default compared with non-smokers, and this is in accordance with other studies suggesting that smokers lead a more 'perilous' lifestyle[10] and develop 'avoiding' coping strategies.[11,12] The study by Jacobson *et al*. showed that financial problems were rarely the cause of infrequent attendance.[13] In our study, education level and social class were not significantly associated with poorer attendance. Together, these studies seem to suggest that patients who default from clinic are not unintelligent or poorly educated, and are not socially deprived. It is possible that these patients are making an informed decision not to attend their clinic appointments and they have elected to disengage from the doctor–patient relationship.[13] If this is the case, a different approach to patients who frequently DNA will be required.

In conclusion, this study has shown that clinic non-attendance is a significant problem associated with poor glycaemic control. By identifying those who are particularly likely to default from their appointments and by understanding the reasons for this, it may be possible to develop intervention strategies to encourage better attendance. Further studies are clearly required in order to ascertain the specific reasons why patient default. With improved attendance rates, it may be possible to optimize glycaemic control, and ultimately reduce the risk of developing diabetic complications.[4]

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